



**Science Mission  
Directorate**

# **NASA Headquarters Update**

**Ramesh Kakar  
Aqua Program Scientist  
October 13, 2009**





# Current HQ Priorities

- Earth Science Operating Missions – Completed Senior Review
- Missions in Formulation and Development
- Decadal Survey Missions

## Weather Focus Area Priority:

- Hurricane Field Experiment



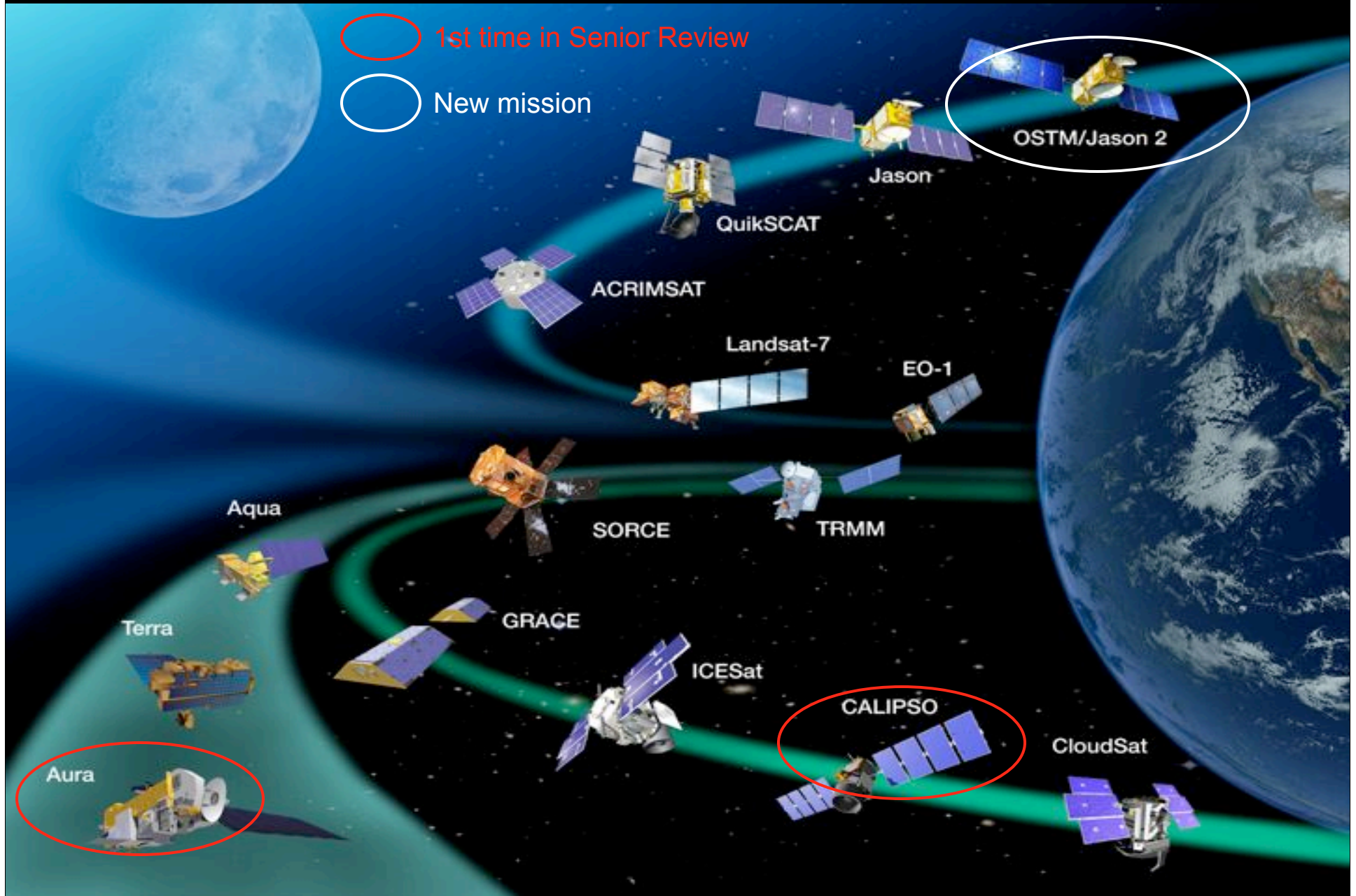


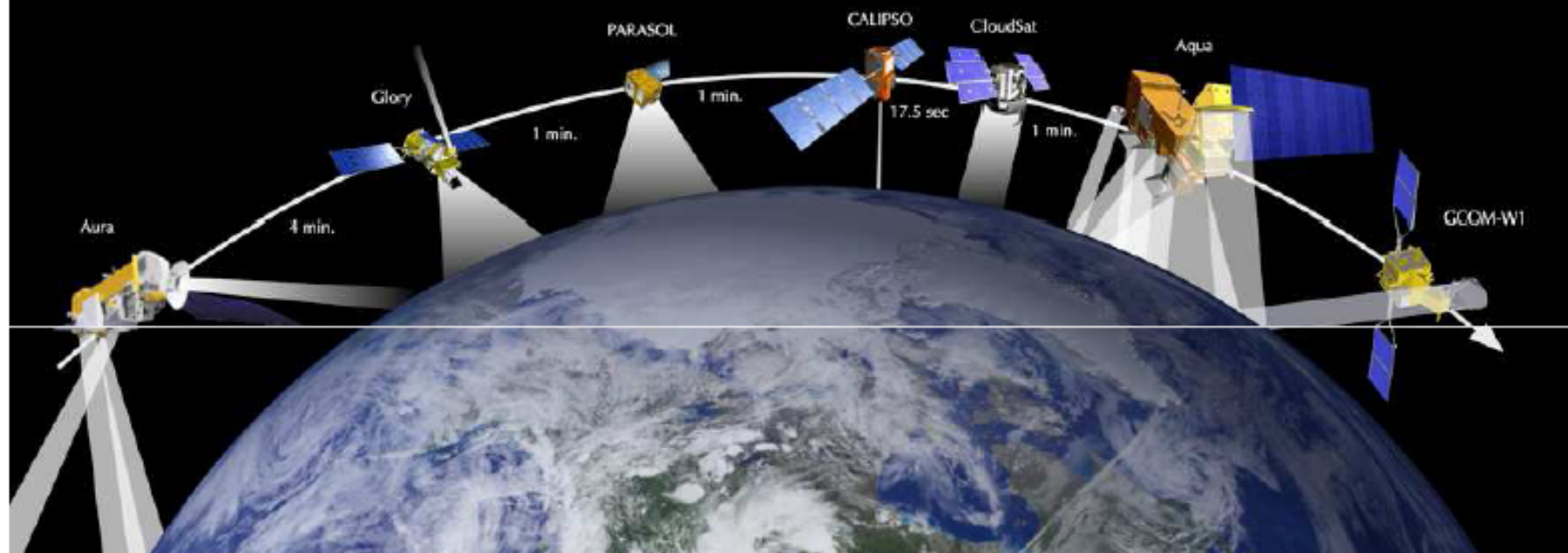
# NASA Operating Research Missions



 1st time in Senior Review

 New mission





**Data Policy for the Afternoon Constellation**  
**Mission Scientists Working Group Meeting**  
**Paris, France hosted by CNES**  
**22 - 23 October 2009**

CNES – JAXA – NASA A-Train Mission Scientist Workshop  
22-23 October 2009, Paris, France

22 October

INTRODUCTION

1300 – 1315	Welcome	Didier Renaut
1315-1330	Introductions & Workshop Goals	Hal Maring

SCIENCE OBJECTIVES OF THE A-TRAIN: Sensor specific and synergistic objectives & plans

Session Chair: TBD

1330 – 1400	Aqua	Elena Lobl
1400 – 1430	Aura	Ernest Hilsenrath
1430 – 1450	PARASOL	Didier Tanre
1450 – 1510	CALIPSO	David Winker
1510 – 1530	Break	
1530 – 1550	CloudSat	Graeme Stephens
1550 – 1610	Glory	Michael Mishchenko
1610 – 1630	GCOM-W1	Haruhisa Shimoda
1630 – 1650	OCO	David Crisp
1650 – 1730	Discussion	All
1730	Adjourn for day	

23 October

A-TRAIN DATA POLICY

Session Chair: TBD

# Earth Science Missions in Formulation and Development



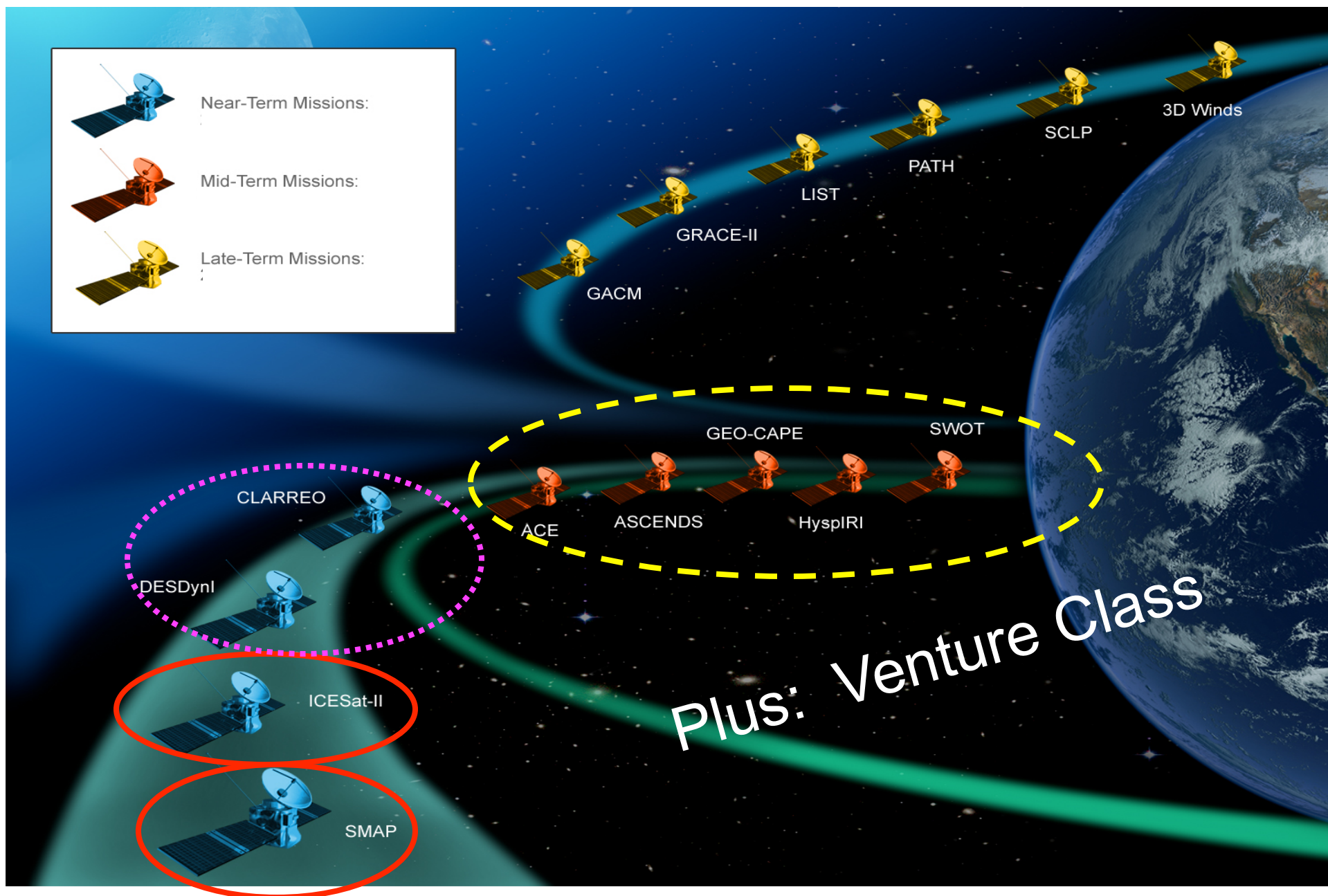
<b>NPOESS Preparatory Project<sup>2</sup></b> Strategic mission - Systematic measurement	Required for continuity of several key climate measurements between EOS and NPOESS
<b>Landsat Data Continuity Mission</b> Strategic mission - Systematic measurement	Required for continuity of long-term global land cover change data; plan for post-LDCM acquisition operational agency in work
<b>Glory</b> Strategic mission - Initiate New Measurement and Continue Systematic Measurement	Addresses high priority objective of the US Climate Change Science Program and provide continuity for total solar irradiance
<b>Aquarius<sup>1</sup></b> Competed mission - Earth System Science Pathfinder	First dedicated global measurement of sea surface salinity from space
<b>Global Precipitation Measurement<sup>1</sup></b> Initializes a systematic measurement	Extend spatial coverage to global and temporal coverage to every 3 hours with constellation
<b>Soil Moisture Active / Passive</b> First Decadal Survey directed mission	Measurement of global, high-resolution soil moisture and its freeze/thaw state

<sup>1</sup> Represents International Partnership   <sup>2</sup> Represents Interagency Partnership





# Decadal Survey Missions Next Generation

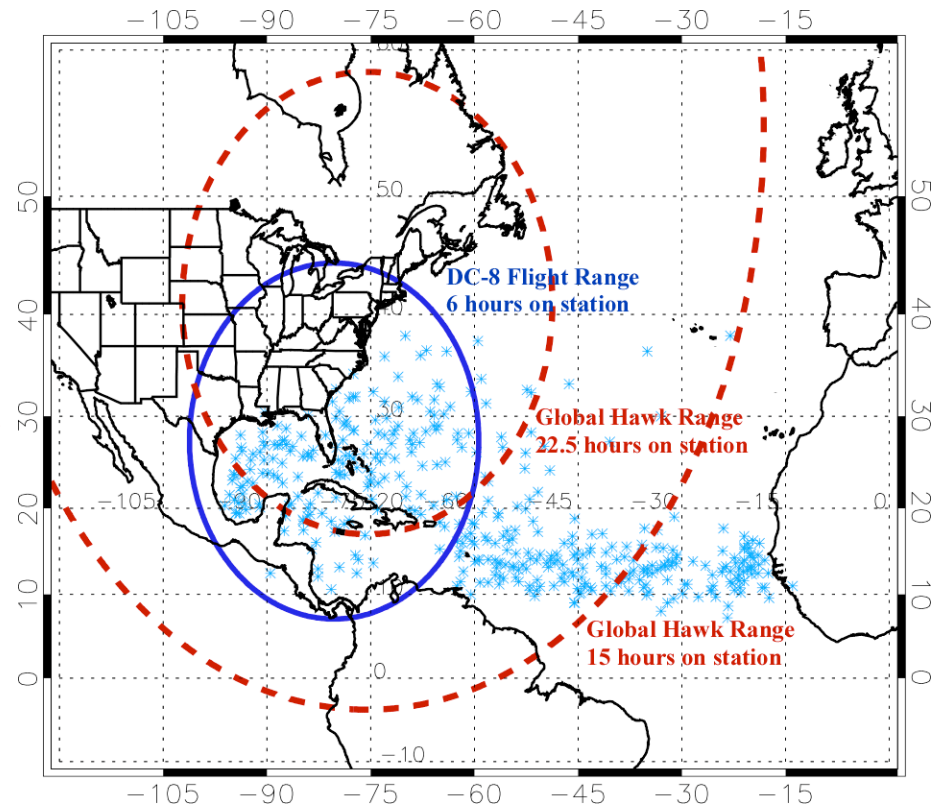




# GRIP: (Hurricane) Genesis and Rapid Intensification Processes Field Experiment

- Global Hawk (UAV) (240 hours)
  - Radar (Heymsfield/GSFC), Microwave Radiometers (Lambrigtsen/JPL), Dropsondes (NOAA), Electric Field (Blakeslee/MSFC)
  - Geosynchronous Orbit Simulation
- DC-8 four engine jet (120 hours)
  - Dual frequency precipitation radar (Durden/JPL)
  - Dropsondes (Halverson/UMBC), Variety of microphysics probes (Heymsfield/NCAR)
  - Lidars for 3-D Winds (Kavaya/LaRC) and for high vertical resolution measurements of aerosols and water vapor (Ismail/LaRC)
  - In-situ measurements of temperature, moisture and aerosols (Bui/ARC)
- Six to Eight week deployment centered on September 1, 2010

RED= IIP, GREEN= IIP+AITT

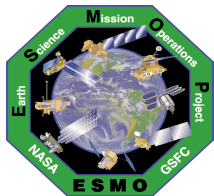


Blue line: DC-8 range for 12-h flight, 6 h on station

Red lines: GH range for 30-h flight with 15 and 22.5 h on station

Light blue X: Genesis locations for 1940-2006

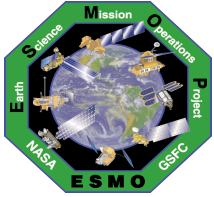




# Aqua Instrument Status

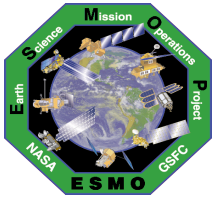


- **AIRS – Nominal Operations**
  - All voltages, currents, and temperatures as expected
- **AMSU-A – Nominal Operations except for Channel 4**
  - All voltages, currents, and temperatures as expected
  - 03/05/08: GES DISC removed Channel 4 data from level 2 processing
- **AMSR-E - ADE Motor Current Torque Increasing**
  - 07/17/07: Threshold changed to 4.5 Nm
  - 07/16/08: Meeting with JAXA Team on contingency response
  - 12/18/08: FOT set red-limit at 4.49 Nm
  - 01/07/09: Spike in ADA motor current and torque (worst observed to date)
  - 06/09/09: AETD Meeting
  - FOT/IOT closely monitoring performance – overall performance has been stable
  - 10/06/09: JAXA/ESMO/AETD Meeting
- **CERES-FM4 instrument shortwave anomaly**
  - No impact to science data products
- **MODIS – Nominal Operations**
  - Next MODIS Lunar Calibration #66 planned for 10/27/09
- **HSB – OFF (Survival Mode)**



# **Spacecraft Anomalies**

## **08/03/09 Solar Panel #8 Thermistor #6 Anomaly**

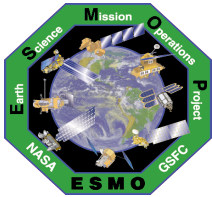


# Solar Panel #8 Thermistor #6 Anomaly

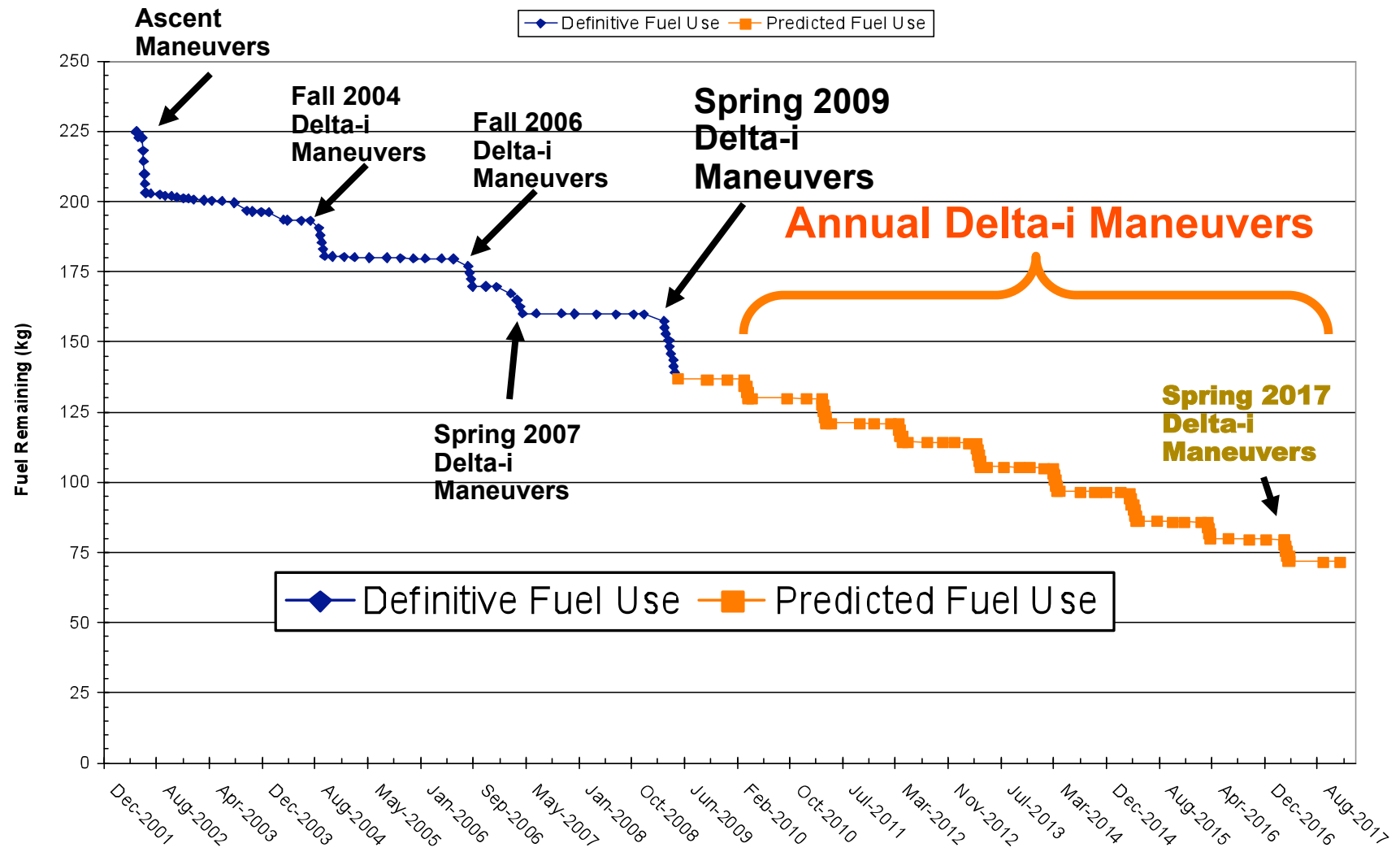


- Aqua Solar Panel #8 Thermistor #6 Anomaly is similar to Aura Solar Panel # 8 Thermistor #5 Anomaly of January 2005. Aura anomaly was eventually attributed to the solar panel connector becoming partially disengaged and resulted in total loss of power from the panel.
  - Aqua has experienced no power loss to date
- 08/11/09: GSFC/AETD (Denny Keys & Mitch Davis) assessment:
  - “Insufficient evidence to indicate that the Aqua anomaly is caused by a connector disengaging” (As in the Aura 2005 Anomaly)
  - “No operational modifications are recommended at this time”
- The FOT has tested the necessary procedures to and is ready to disable the associated ARE and configure the circuitry to an open circuit condition similar to the EOS Aura configuration if necessary (GSFC/AETD & ART Recommendations)
- 10/01/09: [Thermistor #5 continues to provide valid data](#)
- **It's estimated that Aqua could lose 2 solar panels and still perform its science mission**





# Fuel Usage: Actual & Predicted



1/15/10

ESMO PSR - September 2009



# Program Update

- AIRS/AMSU going strong – as far as I can tell cloud-cleared and new trace species retrievals are very useful
- Still need assurance regarding IASI performance and potential CrIS contribution to Climate data sets under cloudy conditions

The “Senior Review” directed the Aqua project to implement its optimal proposal for extended mission operations in all areas except AIRS/AMSU is funded only during FY2010-2011 to develop AIRS greenhouse gas products

CNES-JAXA-NASA A-Train Mission Scientist Workshop, 22-23 October, 2009, Paris, France

“Science related to Aqua and Terra” to be competed via a ROSES 2010 NRA (separate NRA for NPP?)



# Backup Slides



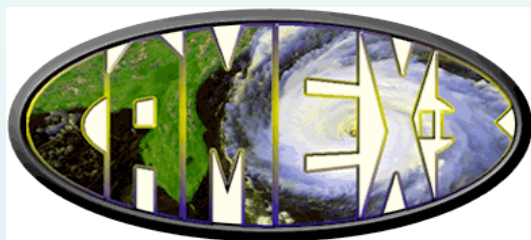




# NASA Hurricane Field Experiments

Field programs coordinated with NOAA/Hurricane Research Division

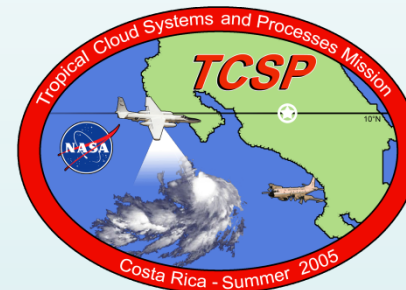
1998



2001



2005



2006



2010 (GRIP logo tbd)



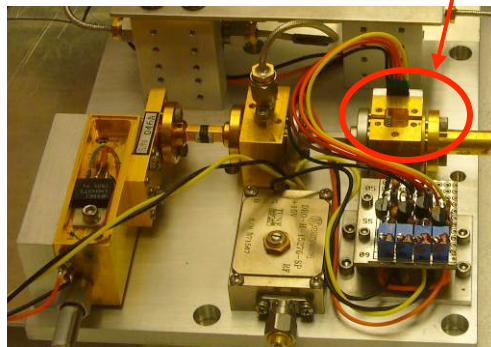


# HAMSR Microwave Sounder on Global Hawk

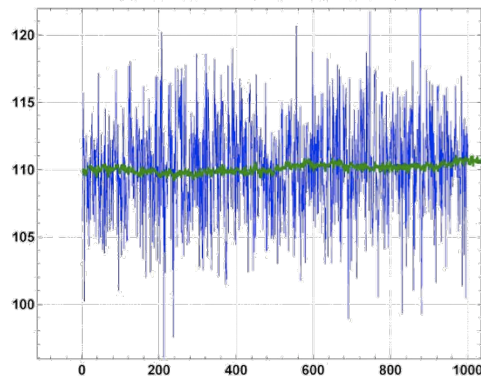
Monitor real-time evolution of tropical cyclones  
Thermodynamic and convective structure  
Risk reduction for decadal-survey "PATH" mission

## New receiver technology

- 183 GHz receiver upgraded with LNA developed under ESTO/ACT
- Noise reduced by an order of magnitude
- Defines new state-of-the-art



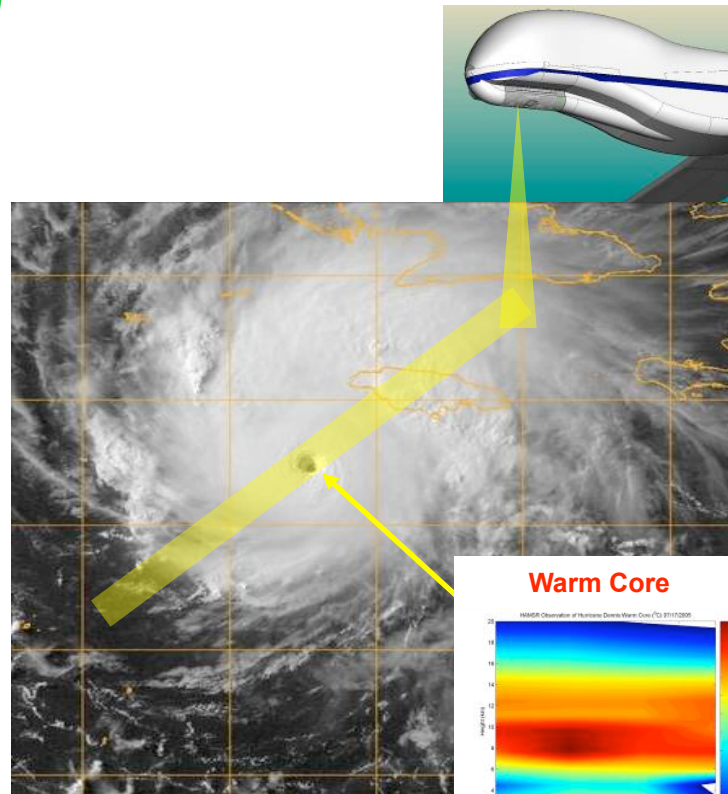
Old and New HAMSR TAs 166 GHz channel



Noise reduced from 2 K to 0.2 K

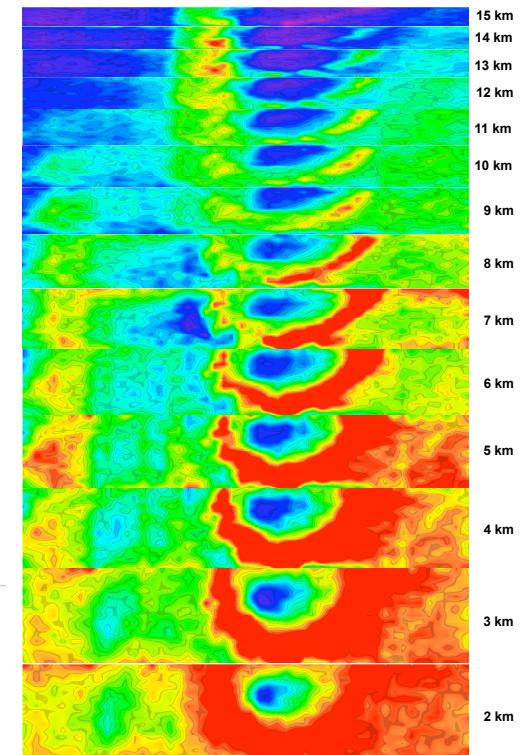
## HAMSR on Global Hawk

- Funded under AITT
- Ready for test flights fall 2009
- Ready for field deployment 2010



## New science/algorithms

- Radar-like observations
- 3D structure of convection
- Enables new investigations



3D reflectivity, Hurricane Emily (2005)